

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-32. (CANCELED)

33. (CURRENTLY AMENDED) A method for providing a dental composition comprising providing a paste/paste two-part self-adhering dental composition, a first paste comprising water and

(a) at least one acidic compound comprising a homopolymer/copolymer of an α,β -unsaturated carboxylic [[acid]] acid;

(b) at least one polymerizable monomer without any acidic group where the polymerizable group is selected from the group consisting of an acrylate, a methacrylate and a vinyl group;

(c) at least one finely divided filler having a mean particle size of less than 50 microns;

(d) at least one oxidizing agent;

and a second paste comprising

(e) at least one polymerizable monomer without any acidic group which is either the same as (b) or different from (b) where the polymerizable group is selected from the group consisting of an acrylate, a methacrylate and a vinyl group;

(f) at least one finely divided filler which is either the same as (c) or is different from (c);

(g) at least one reducing agent;

providing instructions for mixing the two pastes and applying the mixed composition to a dental substrate wherein the ratio of the first paste to the second paste is greater than 1:1 (by volume), ~~wherein each of (a), (d), and (g) are in at least a substantially homogeneous phase.~~

34. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the composition is mixed, applied to the dental substrate, and hardened inside a patient's mouth.

35. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the composition further comprises at least one component selected from the group consisting of a photo-initiator, a stabilizer, a solvent, and combinations thereof.

36. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the filler is selected from the group consisting of inorganic metal, salt, oxide, nitride, silicate glass, aluminosilicate glass, aluminoborosilicate glass, fluoroaluminosilicate glass, quartz, colloidal silica, precipitated silica, zirconia-silica, polymeric filler, polymerized composite filler with inorganic particles, and combinations thereof.

37. (PREVIOUSLY PRESENTED) The method of claim 36 wherein the metal, salt, oxide, silicate glass, aluminosilicate glass, aluminoborosilicate glass, and fluoroaluminosilicate glass contains an element

selected from the group consisting of Sr, Y, Zr, Ba, La, Hf, Zn, Bi, W, a rare earth metal, and combinations thereof

38. (PREVIOUSLY PRESENTED) The method of claim 35 wherein the solvent is selected from the group consisting of water, acetone, methanol, ethanol, isopropanol, ethylene glycol, glycerin, or combinations thereof.

39. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the acidic homopolymer/copolymer is a polymerizable homopolymer/copolymer with at least one ethylenically unsaturated group selected from the group consisting of an acrylate, a methacrylate, and a vinyl group.

40 -41. (CANCELED)

42. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the oxidizing agent is selected from the group consisting of a tertiary hydroperoxide compound with at least one hydroperoxide group attached to at least one tertiary carbon, Cu(II) salt, Fe(III) salt, Co(III) salt, persulfate salt, permanganate salt, and combinations thereof.

43. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the oxidizing agent is a tertiary hydroperoxide selected from the group consisting of t-butyl hydroperoxide, t-amyl hydroperoxide, p-diisopropylbenzene hydroperoxide, cumene hydroperoxide, pinane hydroperoxide, p-methane hydroperoxide, 1,1,3,3-tetramethylbutyl hydroperoxide, and combinations thereof.

44. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the reducing agent is selected from the group consisting of aromatic sulfinate salt, aliphatic sulfinate salt, thiourea, substituted thiourea, ascorbic acid, ascorbic acid derivative and salt, Fe(II) salt, Cu(I) salt, Co(II) salt, barbituric acid, barbituric acid derivative, thiobarbituric acid, thiobarbituric acid derivative and salt, and combinations thereof.

45. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the reducing agent is a substituted thiourea selected from the group consisting of 1-(2-pyridyl)-2-thiourea, 1-(2-tetrahydrofuryl)-2-thiourea, and 1-acetyl-2-thiourea.

46. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the dental composition is selected from the group consisting of a restorative composition, an orthodontic composition, or an endodontic composition.

47. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the dental composition is selected from the group consisting of a dental filling composition, a cement composition, a base/liner composition, a pit/fissure sealant composition, and an adhesive composition.

48. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the paste/paste two-part self-adhering dental composition is provided from a prepackaged container(s).

49. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the first paste is in a first syringe barrel and the second paste is in a second syringe barrel, the first and second syringes selected from group consisting of two non-joining individual syringes and one dual-syringe assembly.

50. (PREVIOUSLY PRESENTED) The method of claim 49 wherein the ratio of an internal cross-sectional area of the first syringe barrel containing the first paste to the second syringe barrel containing the second paste is in the range of 1.05:1 (by volume) to about 20:1 (by volume).

51. (PREVIOUSLY PRESENTED) The method of claim 50 wherein the relative ratio is in the range of about 2:1 (by volume) to about 10:1 (by volume).

52. (PREVIOUSLY PRESENTED) The method of claim 49 wherein a static mixer with an exit opening is attached to exit openings of the dual-syringe to dispense a substantially homogeneous mixed paste.

53. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the first and second pastes are packaged in single-dose form without contact between the first and second pastes and the ratio of the first paste to the second paste is in the range between 1.05:1 (by volume) to about 20:1 (by volume).

54. (PREVIOUSLY PRESENTED) The method of claim 33 wherein mixing is by a method selected from the group consisting of manual mixing, use of an automated mixing device, and use of a static mixer.

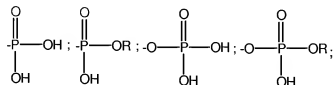
55. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the ratio of the first paste to the second paste is in the range between about 2:1 (by volume) to about 10:1 (by volume).

56. (PREVIOUSLY PRESENTED) The method of claim 33 wherein the mixed composition has a bond strength to an unetched and unprimed dental substrate of at least 3 MPa.

57. (PREVIOUSLY PRESENTED) The method of claim 33 wherein a total concentration of the at least one acidic compound excluding the filler is at least 10% (w/w).

58. (PREVIOUSLY PRESENTED) A method for providing a dental composition comprising providing a paste/paste two-part self-adhering dental composition, a first paste comprising (a) at least one acidic compound selected from the group consisting of

(i) an acidic polymerizable monomer containing at least one polymerizable group selected from the group consisting of an acrylate, a methacrylate, and a vinyl group, and at least one acidic moiety selected from the group consisting of



where R is an alkyl or aryl group;

(ii) an addition product of a mono- or di-anhydride compound with a hydroxyalkyl(meth)acrylate compound; and

(iii) 4-(meth)acryloxyethyltrimellitic anhydride;

(b) at least one polymerizable monomer without any acidic group where the polymerizable group is selected from the group consisting of an acrylate, a methacrylate and a vinyl group;

(c) at least one finely divided filler having a mean particle size of less than 50 microns;

(d) at least one oxidizing agent;

and a second paste comprising

(e) at least one polymerizable monomer without any acidic group which is either the same as (b) or different from (b) where the polymerizable group is selected from the group consisting of an acrylate, a methacrylate and a vinyl group;

(f) at least one finely divided filler which is either the same as (c) or is different from (c); and

(g) at least one reducing agent;

providing instructions for mixing the two pastes and applying the mixed composition to a dental substrate wherein the ratio of the first paste to the second paste is greater than 1:1 (by volume).

59. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the composition is mixed, applied to the dental substrate, and hardened inside a patient's mouth.

60. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the composition further comprises at least one component selected from the group consisting of a photo-initiator, a stabilizer, a solvent, and combinations thereof.

61. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the filler is selected from the group consisting of inorganic metal, salt, oxide, nitride, silicate glass, aluminosilicate glass, aluminoborosilicate glass, fluoroaluminosilicate glass, quartz, colloidal silica, precipitated silica, zirconia-silica, polymeric filler, polymerized composite filler with inorganic particles, and combinations thereof.

62. (PREVIOUSLY PRESENTED) The method of claim 61 wherein the metal, salt, oxide, silicate glass, aluminosilicate glass, aluminoborosilicate glass, and fluoroaluminosilicate glass contains an element selected from the group consisting of Sr, Y, Zr, Ba, La, Hf, Zn, Bi, W, a rare earth metal, and combinations thereof

63. (PREVIOUSLY PRESENTED) The method of claim 60 wherein the solvent is selected from the group consisting of water, acetone, methanol, ethanol, isopropanol, ethylene glycol, glycerin, and combinations thereof.

64. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the acidic compound is selected from the group consisting of hydroxyethylmethacrylate phosphate (HEMA-P), {bis(hydroxyethylmethacrylate)phosphate} (bis(HEMA)-P), glyceryldimethacrylate phosphate (GDM-P), methacryloyloxydecyl phosphate (MDP), phenyl-P, pentaerithritol triacrylate phosphate (PENTA-P), and combinations thereof.

65. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the oxidizing agent is selected from the group consisting of a tertiary hydroperoxide compound with at least one hydroperoxide group attached to at least one tertiary carbon, Cu(II) salt, Fe(III) salt, Co(III) salt, persulfate salt, permanganate salt, and combinations thereof.

66. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the oxidizing agent is a tertiary hydroperoxide selected from the group consisting of t-butyl hydroperoxide, t-amyl hydroperoxide, p-diisopropylbenzene hydroperoxide, cumene hydroperoxide, pinane hydroperoxide, p-methane hydroperoxide, 1,1,3,3-tetramethylbutyl hydroperoxide, and combinations thereof.

67. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the reducing agent is selected from the group consisting of aromatic sulfinate salt, aliphatic sulfinate salt, thiourea, substituted thiourea, ascorbic acid, ascorbic acid derivative and salt, Fe(II) salt, Cu(I) salt, Co(II) salt, barbituric acid, barbituric acid derivative, thiobarbituric acid, thiobarbituric acid derivative and salt, and combinations thereof.

68. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the reducing agent is a substituted thiourea selected from the group consisting of 1-(2-pyridyl)-2-thiourea, 1-(2-tetrahydrofuryl)-2-thiourea, and 1-acetyl-2-thiourea.

69. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the dental composition is selected from the group consisting of a restorative composition, an orthodontic composition, and an endodontic composition.

70. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the dental composition is selected from the group consisting of a dental filling composition, a cement composition, a base/liner composition, a pit/fissure sealant composition, and an adhesive composition.

71. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the paste/paste two-part self-adhering dental composition is provided from a prepackaged container(s).

72. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the first paste is in a first syringe barrel and the second paste is in a second syringe barrel, the first and second syringes selected from group consisting of two non-joining individual syringes and one dual-syringe assembly.

73. (PREVIOUSLY PRESENTED) The method of claim 72 wherein the ratio of an internal cross-sectional area of the first syringe barrel containing the first paste to the second syringe barrel containing the second paste is in the range of 1.05:1 (by volume) to about 20:1 (by volume).

74. (PREVIOUSLY PRESENTED) The method of claim 73 wherein the relative ratio is in the range of about 2:1 (by volume) to about 10:1 (by volume).

75. (PREVIOUSLY PRESENTED) The method of claim 72 wherein a static mixer with an exit opening is attached to exit openings of the dual-syringe to dispense a substantially homogeneous mixed paste.

76. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the first and second pastes are packaged in single-dose form without contact between the first and second pastes and the ratio of the first paste to the second paste is in the range between about 1.05 : 1 (by volume) to about 20 : 1 (by volume).

77. (PREVIOUSLY PRESENTED) The method of claim 58 wherein mixing is by a method selected from the group consisting of manual mixing, use of an automated mixing device, and use of a static mixer.

78. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the ratio of the first paste to the second paste is in the range between about 2 : 1 (by volume) to about 10 : 1 (by volume).

79. (PREVIOUSLY PRESENTED) The method of claim 58 wherein the mixed composition has a bond strength to an unetched and unprimed dentine substrate of at least 3 MPa.

80. (PREVIOUSLY PRESENTED) The method of claim 58 wherein a total concentration of the at least one acidic compound excluding the filler is at least 10% (w/w).